

What Is Claimed Is:

1 1. A method of forming a transflective liquid crystal
2 display device with a wide-viewing angle, comprising the steps
3 of:

4 providing a first substrate and a second substrate opposite
5 the first substrate;
6 forming an insulating layer having an uneven surface on the
7 first substrate;
8 forming at least one opening in the insulating layer;
9 forming a conformal reflective electrode on a sidewall and
10 a bottom of the opening and part of the insulating
11 layer, wherein the reflective electrode has at least
12 one opaque portion and at least one transparent
13 portion, and the transparent portion of the
14 reflective electrode is located in the opening;
15 forming a conformal first alignment film on the reflective
16 electrode;
17 forming a common electrode on an inner surface of the second
18 substrate;
19 forming a second alignment film on the common electrode;
20 and
21 filling a space between the first substrate and the second
22 substrate with negative type liquid crystal
23 molecules added with a chiral agent to form a liquid
24 crystal layer.

1 2. The method according to claim 1, further comprising
2 the step of:

3 forming at least one symmetric protruding element on the
4 insulating layer located around the reflective
5 electrode.

1 3. The method according to claim 2, wherein the symmetric
2 protruding element has a triangular cross-section.

1 4. The method according to claim 1, wherein, when a
2 voltage is applied between the reflective electrode and the
3 common electrode, an asymmetric electric field occurs at a
4 fringe portion of the reflective electrode.

1 5. The method according to claim 1, wherein the opaque
2 portion of the reflective electrode is an aluminum layer.

1 6. The method according to claim 1, wherein the
2 transparent portion of the reflective electrode is an ITO
3 (indium tin oxide) layer.

1 7. The method according to claim 1, wherein a rubbing
2 treatment is not performed on the first alignment film.

1 8. The method according to claim 1, wherein a rubbing
2 treatment is not performed on the second alignment film.

1 9. A method of widening a viewing angle of a
2 transreflective liquid crystal display device, comprising the
3 steps of:

4 providing a first substrate and a second substrate opposite
5 the first substrate;
6 forming a transparent insulating layer having an uneven
7 surface on the first substrate;
8 forming at least one opening in the insulating layer;

9 forming a conformal reflective electrode on a sidewall and
10 a bottom of the opening and part of the insulating
11 layer, wherein the reflective electrode has at least
12 one opaque portion and at least one transparent
13 portion, and the transparent portion of the
14 reflective electrode is located in the opening;
15 forming at least one symmetric protruding element on the
16 insulating layer located around the reflective
17 electrode;
18 forming a conformal first alignment film on the reflective
19 electrode and the symmetric protruding element;
20 forming a common electrode on an inner surface of the second
21 substrate;
22 forming a second alignment film on the common electrode,
23 and
24 filling a space between the first substrate and the second
25 substrate with negative type liquid crystal
26 molecules added with a chiral agent to form a liquid
27 crystal layer.

1 10. The method according to claim 9, wherein the symmetric
2 protruding element has a triangular cross-section.

1 11. The method according to claim 9, wherein, when a
2 voltage is applied between the reflective electrode and the
3 common electrode, an asymmetric electric field occurs at a
4 fringe portion of the reflective electrode.

1 12. The method according to claim 9, wherein the opaque
2 portion of the reflective electrode is an aluminum layer.

1 13. The method according to claim 9, wherein the
2 transparent portion of the reflective electrode is an ITO
3 (indium tin oxide) layer.

1 14. The method according to claim 9, wherein a rubbing
2 treatment is not performed on the first alignment film.

1 15. The method according to claim 9, wherein a rubbing
2 treatment is not performed on the second alignment film.